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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
WEST, JEFFREY R	

ART UNIT	PAPER NUMBER
2857	

DATE MAILED: 03/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/889,040	BARRETT ET AL.	
	Examiner	Art Unit	
	Jeffrey R. West	2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 September 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 August 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *07/11/01*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings in Figures 3-5 and 9-23 are objected to because the images are not of sufficient quality so that all details are reproducible in the printed patent. It is request that in response to this Office Action, Applicant submit lighter copies with greater contrast so that the details can be seen.

2. Figures 9-23 are also objected to because they do not contains sufficiently descriptive labels, specifically the axis are not labeled.

3. Figure 20 is objected to because the image is titled "SSM/I 85 GHz Image for Day 3 . . ." while the specification on page 30, line 24, indicates that the image is a representation of day 2.

4. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

5. The title of the invention, "METHOD OF PROCESSING DATA AND DATA PROCESSING APPARATUS" is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

6. This application does not contain an abstract of the disclosure as required by 37 CFR 1.72(b). An abstract on a separate sheet is required.

7. The disclosure is objected to because of the following informalities:

On page 1, lines 6-7, "to data/image processing apparatus" should be ---to a data/image processing apparatus---.

On page 1, line 23, "etc, etc." should be ---etc.---

On page 4, lines 8-9, it is unclear what it means to be "greater than or equal to zero (and integer)."

On page 9, line 15, "each data samples" should be ---each data sample---.

On page 17, line 23, Applicant should add a heading of "BRIEF DESCRIPTION OF THE DRAWINGS".

On page 19, lines 14 and 23, the weights are labeled $V_1 \ldots V_n / V_m$ while Figure 24 determines "weights $W_1 \ldots W_n$".

On page 32, line 8, "goodness of fig" should be ---goodness of fit---.

Appropriate correction is required.

Claim Objections

8. Claims 1, 6-8, 17, 19, 22, 25, and 28 are objected to because of the following informalities:

In claim 1, line 4, to avoid problems of antecedent basis, "said one or more sensors" should be ---said at least one sensor---. Similarly, on lines 8-9, "the data samples" should be ---the plurality of data samples--- and on line 8, "the area" should be ---an area---.

In claim 1, line 5, to avoid confusion "processing (reprojecting)" should be changed to either ---processing--- or ---reprojecting---.

In claim 6, line 2, to avoid problems of antecedent basis, "the sensor" should be ---the at least one sensor---.

In claim 17, and subsequently claim 22, the method contains steps for "taking" and "having". These words, however, are not usually associated with method steps and it is suggested that Applicant change these words to "receiving" and "providing".

In claim 19, line 2, "sensor(s)" should be ---one or more image sensors---.

In claim 22, line 5, "operating on them" should be ---operating on the original signals---.

In claim 25, line 5, "which in use is used" should be ---which is used---.

In claim 28, line 3, "with the scene" should be ---within the scene---.

The Examiner also notes that claims 7, 8, 25, and 28 use the terms "may be" and "capable of". It has been held that recitation that a function "may be" carried out or that an element is "capable of" performing a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense (In re Hutchison, 69 USPQ 138).

Appropriate correction is required.

Claim Rejections - 35 USC § 112

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 1-21, 23, and 26-32 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, because it recites, "and having a known gain function". However, since the previous claim limitations define "a plurality of data samples", "at least one sensor", "a respective footprint", and "a parameter of a surface", it is unclear to one having ordinary skill in the art whether it is the sensor, samples, footprint, or surface parameter that has the known gain function.

Claim 2 is considered to be vague and indefinite because it contains the confusing language, "with the signal from the footprint on the surface which is incident upon the sensor". It is suggested that Applicant re-word this limitation to something similar to ---with a signal incident upon the sensor, which is received from the footprint on the surface---.

Claim 5 is rejected under 35 U.S.C. 112, second paragraph, because it recites, "(e.g. surface temperature)". The Phrase "such as", or "e.g." renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Claim 17 is rejected as being vague and indefinite because it recites, "the weight" without any previous mention of a weight. Therefore, it is unclear to one having ordinary skill in the art as to what weight is being referred.

Claim 21 is also considered to be vague and indefinite because it recites "the image-gathering apparatus" without any previous limitation defining an image-gathering apparatus.

Claim 23 is considered to be vague and indefinite because it recites "the antennas gain function/sensitivity function" and "the imaging system" without any previous mention of an antenna or imaging system.

Also, in claim 23, it is unclear to one having ordinary skill in the art what it means to "at least partially determine the processed signal."

Claim 27, is rejected under 35 U.S.C. 112, second paragraph, because it is unclear to one having ordinary skill in the art to what "the proceeding aspect of the invention" refers. Claim 27 also recites, "the mapping regions" without any previous mention of mapping regions.

Claim 28 is rejected under 35 U.S.C. 112, second paragraph, for the limitation including "the 'redundant' data" since the "redundant" data is not defined.

Claims 3, 4, 6-16, 18-20, 26, and 29-32 are rejected under 35 U.S.C. 112, second paragraph, because the incorporate the lack of clarity present in their respective parent claims.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 1-14, 16-27, and 29-31, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,323,317 to Hampton et al. in view of Bellerby et al., "Retrieval of Land and Sea Brightness Temperatures from Mixed Coastal Pixels in Passive Microwave Data".

Hampton discloses a method of extracting information from remotely sensed data comprising the steps of acquiring a plurality of data samples from at least one sensor, each data sample corresponding to a respective footprint (i.e. discrete area) (column 4, lines 15-20), and the at least one sensor being adapted to sense a parameter of a surface (column 2, line 63 to column 3, line 6), processing the data samples to produce a respective footprint corresponding to the area of the surface contributing to each data sample (column 5, lines 38-53), selecting a set of n bounded areas (i.e. land parcels) for the surface being sensed (column 5, lines 61-65), as well as means for outputting the processed signal ("40" in Figure 2).

Further, although the invention of Hampton does not specifically disclose allocating a variable to the area defined by each boundary, Hampton does specify that data detected from each of the bounded areas correspond to the parameter to be sensed at points in an image of a surface constructed from an array of data samples from different positions on the surface (column 5, line 66 to column 6, line

17) that are stored in a digital memory as part of the spectral response patterns represented by pixels (column 6, lines 17-23), and the Examiner takes Official Notice that it is well known in the art to store values in a memory array according to variables assigned for each area (see for example, U.S. Patent No. 5,608,636 to Guenther, column 6, lines 49-53 and column 8, lines 59-62).

Hampton also discloses that the sensor is adapted to receive information radiated or reflected form a footprint on the surface to produce the data sample (column 5, lines 38-40).

Hampton discloses that each bounded area is smaller than the size of each footprint for the data samples (column 5, lines 61-65) and that the boundaries are defined by reprojection the data samples onto a GIS map of the surface (column 8, lines 63-67 and column 19, lines 27-35).

Hampton also discloses that the method is implemented on a computer with a corresponding software program (column 4, lines 24-46) having a spatial map upon which the original image signals are to be translated, the map having a plurality of mapping regions, and creating processed image signals for each mapping region (column 4, lines 54-59 and column 15, lines 28-54) wherein there are at least as many original signals in a set as there are spatial mapping regions as data is obtained for each mapping region (column 6, lines 18-20).

Hampton also discloses that the mapping regions are representative of real physical features known to be present in the scene being viewed by the image-

gathering apparatus (column 15, lines 28-54) and that the mapping region being input to the computational means or stored therein (column 11, lines 54-56).

Hampton discloses that the image capturing means is mounted on a remote sensing vehicle such as a satellite (column 4, lines 10-20) including a plurality of sensors that sense radiation (column 5, lines 3-6).

As noted above, the invention of Hampton teaches many of the features of the claimed invention, and while the invention of Hampton does teach determining the characteristics of an areas of land, Hampton does not specify constructing and solving a plurality of linear equations with corresponding weighting coefficients to calculate the land parameters based upon a pixilated land area.

Bellerby teaches a method of processing an original set of signals to create a processed image comprising, taking a set of original signals derived from one or more microwave sensing image sensors (abstract, lines 3-4), the signals being representative of an image to be image processed (abstract, lines 9-11), and the processed image signals for a region is determined by applying a weighting coefficient to the set of original signals as to create a combined, weighted, processed signal associated with the region (page 1846, column 1, lines 8-19) wherein the weighting coefficients are associated with the directional sensitivity of the sensors used to capture the set of original signals (page 1845, column 1, lines 11-15 and page 1846, column 1, lines 45-60).

Bellerby teaches that the processed signal for the region is determined by assuming it to be a constant value (page 1846, column 1, lines 8-9) and solving a number of simultaneous equations which have the processed signal as one parameter, and weighted values derived from the original signals as other parameters, the weighting and the original signals being known (page 1846, column 1, lines 9-19).

Bellerby teaches a method of improving the resolution of an imaging system which generates original pixel signals corresponding to pixels of a pixellated detection field of view (page 1846, column 1, lines 19-23) comprising taking the original signals and operating on them with a weighting function so as to generate processed signals, the weighting function attributing a contributing weight to each original pixel signal as to determine a processed signal for the region (page 1846, column 1, lines 8-19), wherein the weighting function applies an antenna gain function of the imaging system to the original pixel signals to at least partially determine the processed signal (page 1845, column 2, line 53 to page 1846, column 1, line 5) and obtaining values for at least some pixels of the original pixellated field of view (page 1846, column 1, lines 24-31).

Bellerby also teaches an image processing apparatus comprising input signal receiving/capturing means (abstract, lines 3-4) including a microwave antenna (abstract, line 4 and page 1845, column 2, line 26) mounted on a remote sensing vehicle such as a satellite (abstract, line 8).

Bellerby teaches the processing apparatus having a known gain function and defining a weighting for each data sample dependent upon the sensor gain function and the location of the footprint (page 1845, column 2, line 53 to page 1846, column 1, line 5).

Bellerby teaches that more than one set of linear equations is used based upon whether the retrieval method is applied inland or over the open ocean (page 1846, column 1, lines 10-15 and 23-24) and that the footprints for two or more of the data samples used to construct the set of linear equations that correspond to a footprint covering a different but overlapping area may then be calculated from data samples corresponding to a number of such footprints for difference surface areas (page 1846, column 1, lines 8-11).

Bellerby teaches that the data obtained comprises surface temperature measurements (page 1844, column 1, line 5) using the antenna adapted to detect radiation emitted from the surface of the region defining areas of land and ocean at a coastline (page 1844, column 1, line 11 to column 2, line 22).

It would have been obvious to one having ordinary skill in the art to modify the invention of Hampton to include constructing and solving a plurality of linear equations with corresponding weighting coefficients to calculate the land parameters based upon a pixilated land area, as taught by Bellerby, because Bellerby suggests that a problem exists in remotely classifying land, as is the method in Hampton, due to contamination when footprints between land and water intersect (page 1844,

column 1, lines 1-5 and column 2, lines 16-26) and further suggests that the combination would have provided significant value by allowing the parameter retrieval at coastal areas (page 1844, column 2, lines 27-34).

Further, since the invention of Hampton teaches determining data samples for each of a plurality of n bounded areas and storing these desired data values to form an image, and the invention of Bellerby teaches constructing and solving a set of linear equations for variables for each footprint under analysis to determine the desired data values, the combination would have constructed and solved a set of at least n equations corresponding to the bounded areas.

13. Claim 15, as best understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over Hampton in view of Bellerby and further in view of U.S. Patent No. 5,027,419 to Davis.

As noted above, the invention of Hampton and Bellerby teaches many of the features of the claimed invention including calculating a convolution of a sensing antenna gain function with a signal from a footprint, but does not specify approximating the convolution with a summation.

Davis teaches a method for processing an image (column 3, lines 16-20) through convolution (column 3, lines 25-27) wherein the convolution is approximated with a summation (column 7, lines 46-59).

It would have been obvious to one having ordinary skill in the art to modify the invention of Hampton and Bellerby to include approximating the convolution with a

summation, as taught by Davis, because it is well known in the art to approximate complex integrals in order to adhere to time and processing constraints and Davis suggests that the combination would have provided an adequately precise approximation for practical purposes (column 7, lines 58-59).

14. Claim 28, as best understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over Hampton in view of Bellerby and further in view of U.S. Patent No. 5,625,409 to Rosier et al.

As noted above, the invention of Hampton and Bellerby teaches all of the features of the claimed invention except for oversampling an observed scene to create a plurality of sensed original image signals for elements within the scene and using the oversampled data to improve the resolution of the system beyond the resolution of the image capturing means alone.

Rosier teaches a high resolution long-range camera for an airborne platform, such as an aircraft (column 3, lines 25-30), wherein a plurality of images, which overlap, are obtained and superimposed (column 6, lines 33-42). Rosier also teaches that the observed scene is oversampled to improve the resolution of the image capturing means alone (column 6, lines 49-52).

It would have been obvious to one having ordinary skill in the art to modify the invention of Hampton and Bellerby to include oversampling an observed scene to create a plurality of sensed original image signals for elements within the scene and using the oversampled data to improve the resolution of the system beyond the

resolution of the image capturing means alone, as taught by Rosier, because Rosier suggests that the combination would have provided a method for improving the resolution of the image obtained (column 6, liens 49-52), thereby increasing the level of detail able to be determined for more accurate results.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure.

U.S. Patent No. 5,608,636 to Guenther teaches a method for controlling the column-by-column printing of a franking image in a postage meter machine including assigning a variable corresponding to each of a plurality of pixels stored in memory.

U.S. Patent No. 5,243,541 to Ulich teaches an imaging LIDAR system for shallow and coastal water.

U.S. Patent No. 5,805,106 to Baum teaches dual polarization wave clutter reduction using weighting functions.

U.S. Patent No. 5,886,662 to Johnson teaches a method and apparatus for remote measurement of terrestrial biomass including a footprint divided into a plurality of sections.

U.S. Patent No. 5,467,271 to Abel et al. teaches a mapping and analysis system for precision farming applications.

U.S. Patent No. 5,270,780 to Moran et al. teaches a dual detector LIDAR system and method.

Gautier et al., "Issues Linked to Geographical Information Systems in Global Environmental Research: Data Base Handling and Multi-Sensor Data Fusion" teaches processing methods associated with data received by sensors at international Earth Observing platforms.

Thome et al., "ASTER Preflight and Inflight Calibration and the Validation of Level 2 Products", teaches calibrating approaches for the Advanced Spaceborne Thermal Emission and Reflection Radiometer.

16. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Jeffrey R. West whose telephone number is (571)272-2226. The examiner can normally be reached on Monday through Friday, 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S. Hoff can be reached on (571)272-2216. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

jrw
February 20, 2004

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